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POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

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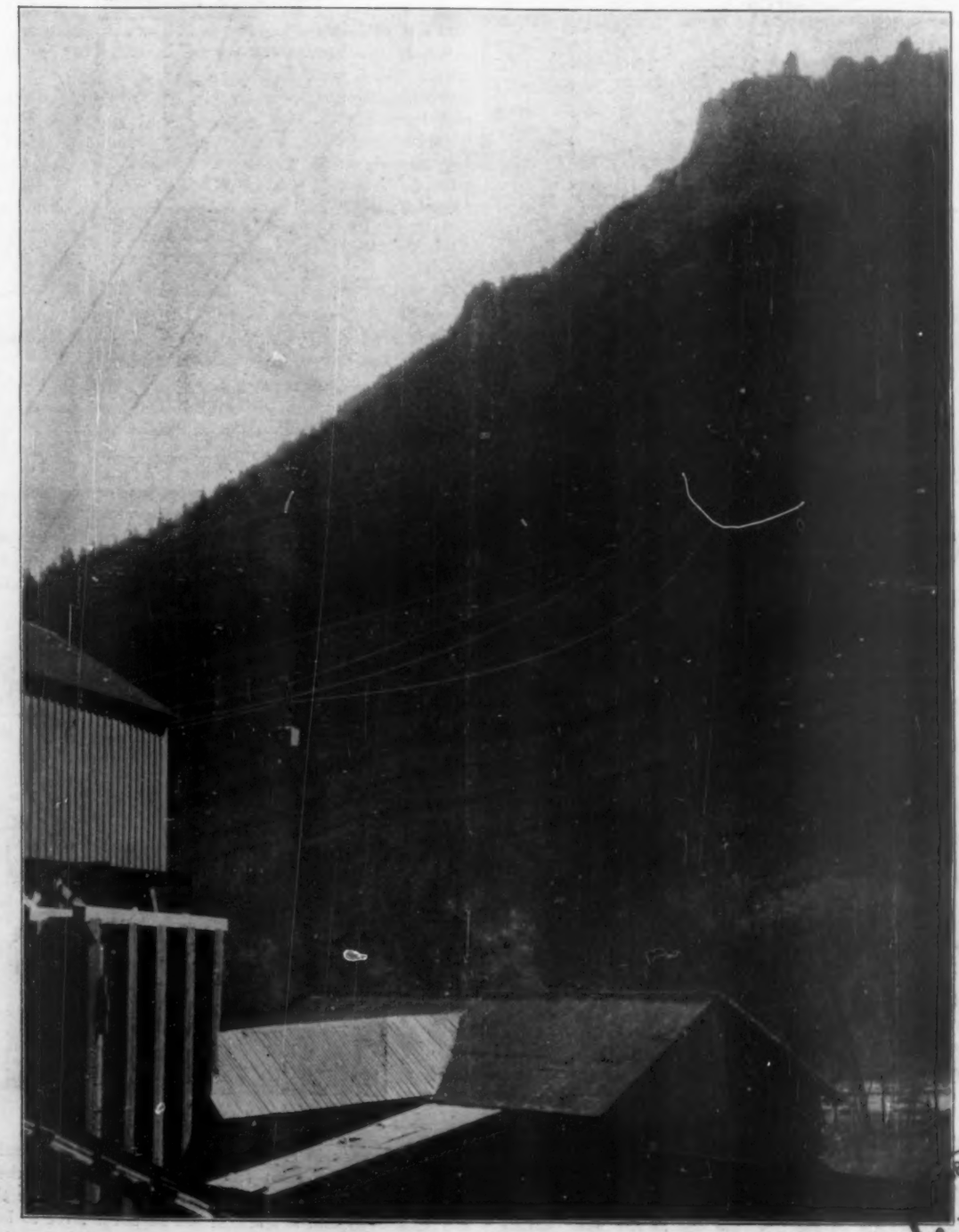
Passengers Ride 2,000 Feet in Air.



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SMITHSONIAN DEPOSIT.

A RAILWAY IN THE AIR.

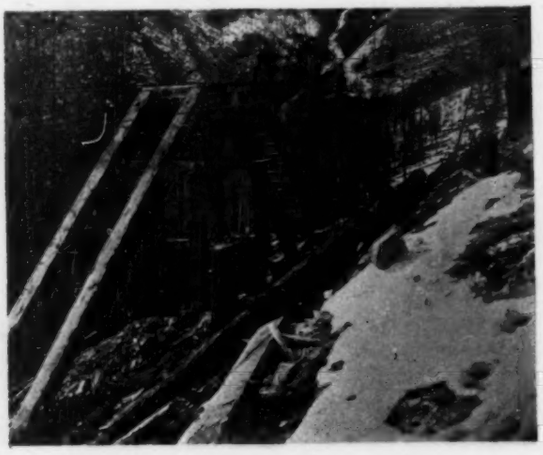
Passengers Can Look Down 2,000 Feet.

A railway reaching up 2,000 feet in the air, with steel ropes for tracks and strong iron buckets for cars, constitutes the only means of transportation to many mountain heights. On this slender support and suspended in mid-air above a canyon through which rushes a torrent, freight and passengers are carried daily. The parting of the rope or the accidental overturning of the bucket would dash the victim to distant death.

SUPPORTING TOWER.

Perilous as such travel is, so strongly constructed is the line and so carefully operated the machinery, that accidents are few. The person who would venture the trip, however, must have a cool head and steady nerve.

We illustrate one of the many systems of aerial tramway, the scene shown being Deep Gulch, in the Rocky Muntains, of Colorado. The line is 4,200 feet long extending from the works of the American Gold Mining Co., in the valley, up 2,000 feet to the mouth of the mine. Any other mode of communication is impossible. The line was built by Leschen & Sons Co., of St. Louis, and consists of two stationary sustaining cables se-



TENSION STATION.

curely anchored at each end. The loaded buckets run on a rope 1⅛ inch in diameter, while the empties return on a 1-inch rope. The buckets are propelled by an endless steel wire rope ¾ inch in diameter. This rope passes around one 8-ft. sheave at both the terminals of the line, the one at the mine having a number of grips which clamp the rope tightly and afford the means to control the speed of the tramway when in operation. To this wheel are attached the brake-bands for stopping the tramway or controlling it.

The buckets are attached and detached automatically to and

WHERE PASSENGERS RIDE.

from the traction cable by means of patent clips, button-shaped, which are attached permanently to the cable. Each of the buckets has a capacity of 6½ cubic feet and they are so placed in the pendent as to swing freely, thus allowing them to be dumped at the lower station of the line as described later.

PASSING OVER A HILL.

The difference in elevation between the two terminals of the tramway is about 2,000 feet, and the weight of the loaded buckets traveling down is sufficient by far to operate the tramway by gravity and in addition has sufficient force to bring sup-

plies up to the mine. About midway of this tramway is placed what is known as an intermediate station, so designed that later on it can be used for loading ore from another mine located near by. This intermediate station is situated in a position where snow falls very heavy, and for that reason the entire length of the terminal for a considerable distance on each side is covered with a snow shed.

At the lower terminal of the line the tramway consists of a single span 2,100 feet in length without any means of support between. This is the most remarkable feature of this tramway, and is illustrated by the photo mentioned above. Owing to the automatic levers with which this tramway is furnished, very little labor is required in the entire operation, and breakings are reduced to a minimum. As a bucket enters the upper terminal it is automatically detached from the traction rope and its momentum is overcome gradually when it is placed in the loading position. After it is loaded it receives an acceleration to overcome its inertia, and is then again attached to the line automatically and travels to the lower terminal. At this station the same operation occurs. In addition, however, the bucket is automatically dumped by means of a frame connected with the terminal shaft. As soon as the bucket enters this terminal and before it is discharged it is weighed automatically by a specially designed scale. The ore brought down in this tramway is of two classes; one which is loaded into the buckets in bulk, and the other of a higher class, which is loaded into the carriers in sacks.

TO DISPATCH TRAINS BY ELECTRICITY.

Radical Change of System Inaugurated by the Illinois Central.

The decision of the Illinois Central railroad to equip its road with telephone apparatus for the transmission of train orders is looked upon as a most important victory for the telephone over the telegraph.

The promoters of the new system say that it will completely revolutionize the service; that officers of the company will be placed in quick, constant and personal communication with every point on the line; that with slight improvements, already provided for, the telephone will furnish greater safety for train orders; that it will greatly reduce the cost of operation and result in a higher grade of service generally. The installation of the new system will cost about $100 per mile, or, approximately $540,000 to equip the entire road.

After continued experiments on big eastern roads the telephone has been declared a failure in railroading. The method has been experimented with by the Delaware, Lackawanna & Western, and the New York, New Haven & Hartford roads for years, but neither has had the temerity to adopt the system in lieu of the telegraph.

REMOVING RUST FROM POLISHED STEEL.

In the Journal of the United States Artillery instructions are given for caring for ordinance. The treatment recommended for rust on polished steel is as follows: Cyanide of potash is most excellent for removing rust and should be made use of. Instruments of polished steel may be cleaned as follows: First, soak, if possible, in a solution of cyanide of potassium in the proportion of one (1) ounce of cyanide to four (4) ounces of water. Allow this to act till all loose rust is removed, and then polish with cyanide soap.

The cyanide soap referred to is made as follows: Potassium cyanide, precipitated chalk, white castile soap.

Make a saturated solution of the cyanide, and add chalk sufficient to make a creamy paste. Add the soap cut in fine shavings, and thoroughly incorporate in a mortar. When the mixture is stiff, cease to add soap. It may be well to state that potassium cyanide is a violent poison.

For removing rust from iron the following is given: Iron may be quickly and easily cleaned by dipping in or washing with nitric acid, one (1) part; muriatic acid, one (1) part; water, twelve (12) parts. After using, wash with clean water.

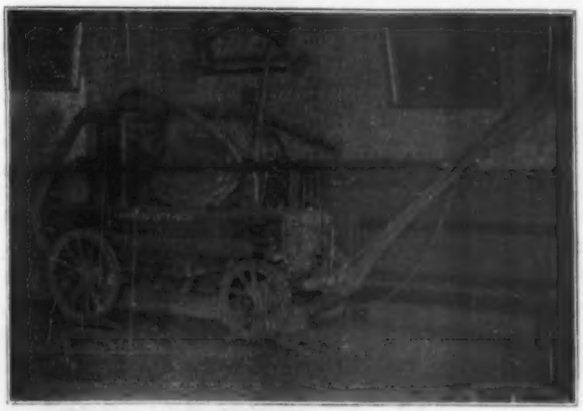
NEW SAFEGUARDS FOR VESSELS.

When a collision occurs at sea, or fire breaks out on board ship the first effort is to close the bulkheads. These bulkheads are steel partitions extending across the boat and from bottom to deck, are made of steel with doorways cut through. A vessel might fill with water and sink before all the doors could be shut. The latest improvement, says the American Shipbuilder, is a system by which the watch officer on the bridge is able to close all open compartment doors by the movement of a small lever. When the lever is thrown an alarm bell sounds at each door for 20 seconds and a light is turned on to give sailors a chance to escape who might otherwise be shut in. The closing of each door is reported to the officer in charge by the showing of a lighted number. Electricity and hydraulic power do all the work after "the button is pushed."

OLDEST FIRE ENGINE IN ILLINOIS.

The oldest fire engine in Illinois is the Phoenix at Quincy. It is a hand engine and was placed in use by the volunteer fire department in 1835. It did service for forty years and several times was instrumental in saving the town from destruction by fire.

The engine has long been kept by the Firemen's Benevolent Association of Quincy as a relic. The association has recently



OLDEST FIRE ENGINE IN ILLINOIS.

been offered $1,000 for it and the proposition was debated without final action at a recent meeting. Several of the old-timers present said that they "ran with the old engine" forty-odd years ago and they were loth to see it go. The engine is a quaint contrivance and in striking contrast to those used at the present day.

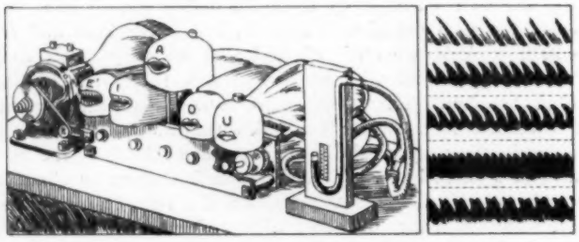
A great electric bell 50 feet under water hung below a buoy constitutes the latest things in fog signals, now being tested on the New England shore. Water being a good conductor of sound, a person placing his ear against the hold of a vessel, it is said, can hear the bell ten or twelve miles away. At the same time it cannot be objectionable to residents along the nearby sea shore.

Salmon skins are to be used in the manufacture of glue. An American has closed negotiations with leading salmon canners, and two factories are to be built on the big runs in British Columbia.

MACHINE THAT MAY REALLY TALK.

Already Utters the Vowel Sounds and Remarkable Results Are Expected.

A machine that can really talk is expected to result from an invention of Dr. Marage of London. He has succeeded in constructing an apparatus that can utter plainly and distinctly



MACHINE FOR UTTERING VOWELS.

the five vowels, a, e, i, o, u. This remarkable result is achieved by passing currents of air through a series of receptacles, the interior shapes of which ahe exactly like those of the human mouth when it pronounces the vowels. The first illustration shows the machine and the second the waves of vibrations of various vowel sounds.

Of course the phonograph is not a talking machine, because it merely gives off a record that has already been made upon a cylinder by an actual human voice. Dr. Marage's machine creates the vowel sounds at first hand. These false mouths, as it were, are made of plaster of Paris and are fitted to sirens giving the appropriate combinations of sounds. Dr. Marage then sets his machine to operation and the vowels are produced synthetically. The inventor purposes to modify the steam sirens used on shipboard, so that they will imitate the vowel sounds. Thus different phonetic syllables may be obtained which may be used as an international alphabet. Another important application of the synthetic process can be made in the construction of ear trumpets that will not fatigue the ear, because they will not modify the grouping of oscillation adapted to the ear. Dr. Marage has also constructed the "acouometer,' giving a typical sound of the vowel "a," for example, which may be used as a standard to which certain other sounds may be referred.

HOW TO TEMPER AND HARDEN TAPS.

A successful method of tempering and hardening taps is described by W. B. Allen in the American Blacksmith:

The completed tap is first brought to a blood red and even heat. Dissolve a handful of salt in a bucket of clean water, set the water to whirling by stirring in it a stick and thrust the heated tap vertically into the vortex of the whirlpool.

The tap is to be drawn to a straw color. Heat a peice of cast iron tube to a dull red heat. The tap is then to be held in the center of the tube and carefully turned until the proper color is produced. Quenching will fix the color and finish the tap.

COMPRESSED AIR FOR LOCOMOTIVES.

Locomotives to haul trains hundreds of feet under ground must be very different from those we are accustomed to see on our steam railroads. One of the greatest dangers the coal miner has to guard against is an explosion of fire-damp, which can be set off by a single tiny spark. In the coal mines of Pennsylvania are hundreds of miles of railway tracks on which the coal is hauled to the hoisting shaft. In one of these mines the mule will now be displaced by a locomotive capable of drawing long trains and at much faster speed.

To avoid all danger these locomotives are run by compressed air instead of steam. Six of them have been built at the Baldwin works and are described in the Practical Engineer as follows:

The engines used are of the usual compound type, having respective piston diameters of five, eight and twelve inches. The drivers are 24 inches in diameter, with a total wheel base of 4 feet 6 inches, the track gauge being 4 feet. The air supply is gained from two great tanks, which may be noticed in the accompanying illustration, set side by side. These tanks are of 30 inch inside diameter and average 14 feet in length, the storage-pressure capacity of each being 600 pounds per square inch, from which 200 pounds working pressure is maintained upon the engine cylinders. The supply of air can readily be replenished in these tanks from nozzles connected with high-pressure pneumatic tubes, which can be placed at points convenient for this purpose. The total weight of driver and tanks is only 22,000 pounds. This shows how compact and complete this motor is, while combined with that is the strength of the average steam locomotive of equal cylinder area.

LOCOMOTIVE DRIVEN BY COMPRESSED AIR FOR COAL MINES.

THE STEEL INDUSTRY OF SCOTLAND.

Important Changes Worked by Growing Scarcity of Hematic Ores.

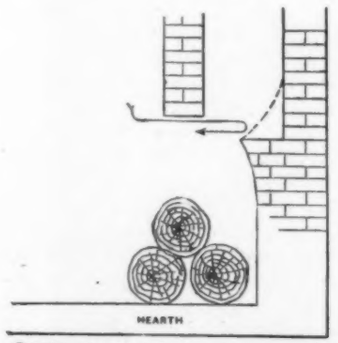
Growing scarcity of hematic ores is one of the principal factors that is working radical changes in the character of the steel industry in Scotland. Also there are the necessities of competition, calling for a continuous process of production from the native ore to the finished steel plate.

The Scotch steel industry really dates from 1871, says the Age of Steel in an exhaustive review of the rise and progress of the Scotch steel industry appearing in its issue of Dec. 21. In that year the Steel Company of Scotland, Limited, was formed, in order to utilize the "purple ore" residue in the "wet" process of the Tharsis Copper company, whose chief extracting works were then at Glasgow. It was not until 1873 that the first ingots were cast and a month later the first steel rails were made in Scotland. This company was successful in founding a mild steel industry in Scotland and also in inaugurating a revolution in shipbuilding.

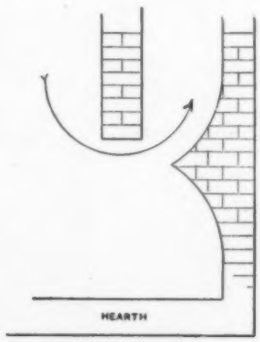
The largest steel works in Scotland at present are the Dalzell works of David Colville & Sons at Motherwell, started in 1872. It has 20 open-hearth Siemen's furnaces of from 20 to 50 tons capacity, and produces 6,000 tons of ingots per week.

Wm. Denny & Bros., of Dumbarton, were the first shipbuilders to recognize the advantages of mild steel. Their success that followed induced them to erect new works at Newton and to devote themselves to the manufacture of plates instead of rails.

Steel rails are no longer manufactured in Scotland, as there is a more profitable demand for other material. The Newton works now have five furnaces of 40 tons capacity, nine of 25 tons and two of 23 tons.



Construction that Produces a Down Draft



A Better Construction.

The Blackhairn works in the northern district of Glasgow, have four 50-ton, six 40-ton, and six 25-ton furnaces producing 250,000 tons of ingot steel per annum.

Until 1879 the Steel Company of Scotland remained as the only makers of open-hearth steel in the country. In that year William Beardmore & Co., Parkhead, Forge, Glasgow, entered the field. As a forge this company dates back to the 19th century. From a very small concern it has in the course of two or three generations grown to be one of the biggest in Scotland. It covers nearly 50 acres of ground and is now both a forge, a steel works and an armor plate factory. The furnaces range in capacity from 20 to 30 tons. The firm has acquired the shipbuilding and engineering business of the historic firm of Robert Napier & Sons, and are at present laying down a new shipyard and marine engine shop at Dalmuir, near Glasgow.

Other leading companies in Scotland are:

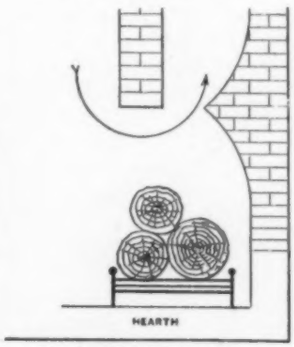
The Summerlee & Mossend Iron company, founded by J. B. Neilson, inventor of the hot-blast, has twelve furnaces of from 20 to 40 tons capacity; the Merry & Cunninghame works at Glenar Glengarnock, three 30-ton open-hearth furnaces, four 8-ton Bessemer converts and a girder mill; the Clyde-Bridge Steel works of Glasgow, erected in 1888, nine 35-ton furnaces, two plate mills and a cogging mill, has a capacity of 65,000 tons of ship-plates per annum; the Clydesdale Steel Works, of A. & J. Stewart & Menzies, Limited, nine 40-ton Siemens-Martin smelting furnaces, 26 puddling furnaces and six rolling mills, produces ship plates, boiler plates, bridge plates, strips and hoops for tube-making and ingots and slabs for forgings; the Lankashire Steel company, near Glasgow, established in 1890, five 50-ton and five 25-ton furnaces, large cogging mill; the Coltness Iron company, founded in 1837, output steel castings for locomotive wheels, etc.; the Calderbank Steel works of J. Dunlop & Co., Limited, two 50-ton, one 40-ton and two 25-ton furnaces, output boiler and ship plates; the Springfield Steel Works, Glasgow, one 17-ton furnace, specially devoted to casting for electrical, marine and mill engines. The Acme, the Mount Vernon and the Dumbarton works, all near Glasgow, are smaller concerns.

Practically all the steel making in Scotland is by the Siemens acid open-hearth process. There are 115 Siemens-Martin furnaces, the producing capacity of which is about 1,200,000 tons per annum. The Bessemer plant at Glengarnock produces about 60,000 tons additional. In 1880 there were less than 20,000 tons of steel ship built on the Clyde; in 1901 the tonnage was about 500,000 tons.

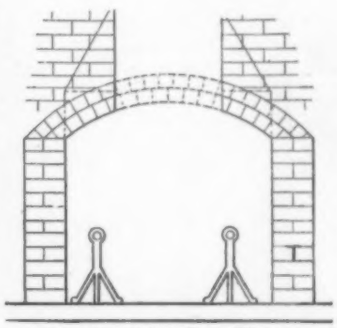
SMOKY FLUES—OPEN GRATE DRAFTS.

Cold drafts dangerous to health are caused by open hearth fireplaces, says "Old Rasinhead" in the Metal Worker of Jan. 11. If you must have these ornamental pneumonia breeders avoid a bad construction.

Some grate flues are supposed to have a down draft when they have not, and the first example shows how this can be. I have remedied this defect, as shown by the dotted line, by slipping a heavy curved piece of sheet iron in on the shelf behind, and on the top of the grate back. The construction shown in the next view, is better, but I believe that shown in the third is best, although it is not apt to radiate as much heat. The throat should be narrow in order not to admit more air than the flue can carry up. The gases dodge around the point of the throat rapidly, but after they are past they move more sluggishly. Yet there is no danger of their coming back, as the gases imediately behind push them on. Openings into the flue should not be narrowed up, as shown by the dotted line, but by the slanting solid lines, as indicated in the fourth example.



The Correct Construction.



Connection of Fire Place Flue.

The great trouble with grates and fire places is that the opening permits so much air other than that which is required for combustion of the fuel, to crowd itself into the flue, that the space required to carry off the gases is limited to less than that which is required for the purpose unless the construction makes it easier for the gas to escape than for the air to rush in. This is the warm air of the room, which is needed for comfort, and its escape to the end of ventilation is what some people call "healthy."

The total fire loss of the United States and Canada for 1901 was $164,347,450.

Easy Electrical Experiments

FOR BOYS.

ELEMENTARY STUDIES IN ELECTRICITY.

L. P. DICKINSON.

CHAPTER 4: How to Make a Tangent Galvanometer.

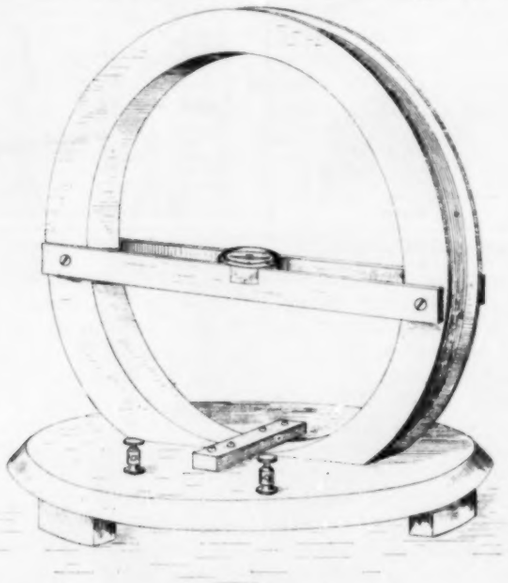
In chapter two, directions were given for making a galvanometer for the detection of electric currents. While an instrument such as was there described is very useful for general testing purposes, it is not at all suitable for the measurement of currents. The tangent galvanometer, on the other hand, is an instrument in which the parts are so related that we can readily calculate the strength of the current flowing through it.

To make such an instrument, take a piece of whitewood ½ inch thick, and saw out of it a ring whose outer diameter is 10½ inches, and whose inner diameter is 9 inches.

Cut two similar rings from a piece of whitewood ¼ inch thick, the rings in this case being 11 inches in outer diameter, and 9 inches in inner diameter. Glue these pieces together so that the thicker ring is between the two thinner ones, forming a ring with a channel on its outer surface which is ¼ inch deep and ½ inch wide.

From another piece of whitewood ¾ inch thick cut a circular piece 11 inches in diameter. In the center of this cut a hole 6 5-16 inches in length, and 1 inch wide. This last piece is to serve as a base upon which the ring is to be supported vertically. Three cleats ½ inch spare should be glued to the bottom of the board to serve as supports for the instrument.

The arrangement is clearly shown in the accompanying figure.



TANGENT GALVANOMETER

The ring should fit into the slot in the base so that its inner surface is just even with the upper surface of the base board, and is secured by a small strip screwed to the base board as shown.

The cutting of these circular pieces is not at all difficult if a band saw driven by power be used, such as almost every fair sized carpenter shop should possess. It can be done, however, by means of an ordinary key-hole saw.

Before mounting the ring upon its base, wind in the groove upon its circumference eight turns of No. 16 double cotton covered magnet wire. Fasten the loose ends together with a string temporarily. Across the two flat sides of the ring fasten two strips of whitewood ⅝ inches wide, ¼ inch thick, and 11 inches long. These should be fastened so that their upper edges pass exactly through the center of the ring.

Procure an ordinary pocket compass about 1¼ inches in diameter and cut grooves in the middle of the last mentioned strips, so that the compass will be supported as shown in the figure, with the center of the needle exactly at the center of the coil. Its zero mark should lie half way between the two strips.

Now place the ring supporting the compass at its center, into the slot in the base board, connect the two ends of the wire to two binding posts, give the whole a coat of brown shellac, and the instrument is ready for service. All dimensions given are very important. Any deviation from them will introduce errors in the results obtained by its use.

To use the instrument, first remove from its neighborhood all pieces of iron or steel, especially any magnets that may be in the vicinity. At this point it may be mentioned that all screws used in the instrument should be made of brass. Set the galvanometer upon a level table, and turn it until the needle, pointing north and south, and swinging freely, lies exactly in the plane of the coil. If the directions regarding the mounting of the needle have been followed, it will then point to zero. Send the current from one cell of battery through the coils. The needle will be deflected to the one side of the other, and will finally come to rest at a certain angle,—let us say 45 degrees. The dimensions of the instrument have been so chosen that when the deflection is 45 degrees, the current flowing through the coils upon the ring is one-half an ampere. The ampere is the unit chosen to designate the strength of an electric current. For other angles, the value of the current may be found from the following table:

Angle.	Current.
10 degrees	.088 amp.
20 "	.182 "
30 "	.289 "
40 "	.420 "
45 "	.500 "
50 "	.600 "
55 "	.715 "
60 "	.865 "
70 "	1.375 "

Since the force with which the earth acts upon a magnetic needle varies for different places, the values just given for the current will not be true for all parts of the country. The table gives correct values for the immediate vicinity of Chicago, and for that section of the United States lying east of Chicago, and north of the Ohio River. For places south of the Ohio, and east of the Mississippi, the results given in the table for the values of current should be multiplied by 1.3.

West of Chicago, and east of the Rocky Mountains, they should be multiplied by 1.16. Finally for the Pacific Coast, the values given should be multiplied by 1.3.

(To be continued.)

"FALLING THE FALLS" IS THE LATEST.

Falling the falls is destined to become a popular sport among women who have passed the meridian in life since the knowledge of the offers of marriage that were showered on the last piece of femininity that went over the Niagara cataract in a barrel. Scarcely had the news of her daring deed been flashed over the wire and she had changed her clothes and applied liniment to her bruises than she received a proposal by wire from a professor of physical culture. She that had ridden the cataract was wooed by lightning. Then the offers came by telephone, registered and special delivery letters and by the regular mail. Thus the perplexing problem of how a woman of 50 without dowry can secure a husband is solved and barrels specially adapted to "falling the falls" will doubtless soon be in demand. First, it was "sliding the slides" on a common toboggan; then it was to "shoot the chutes," followed by the nerve-racking "loop the loops," and now it is "fall the falls." What next?

WORKING RAILROAD SWITCHES BY ELECTRICITY.

Switches Miles Distant as Instantly and Easily Turned as One Rings a Door Bell.

The movement of 1,100 trains daily on a network of tracks extending from Council Bluffs, Ia., to Gilmore, Neb., including the union depot yards at Omaha, are now operated from two towers with one man in charge of each. Electricity is the agent which carries the message from the operator to a small electric motor placed at each switch, instantly setting the rails in the right position and at the same time showing the proper signal to the engineer. At night the signals are with electric lights. The switch motor is of one horse-power and does its work in two seconds. At the operator's tower are storage batteries, which are kept supplied by two gasoline engines of five horse-power each.

OPERATOR TURNING TRACK SWITCHES MILES DISTANT.

One gallon of gasoline, costing 11 cents, furnishes power to generate sufficient electricity to make 2,845 switch movements. The Railway Age of Jan. 17 fully describes the system. The operator by the slight movement of a small lever can instantly turn a switch miles away. Our illustration shows some of these controlling levers, with the operator at work.

PASTE FOR MOUNTING PURPOSES.

To prepare a paste for mounting purposes.—Mix ¾ ounces of starch with a little water to form a smooth cream, and pour on it sufficient boiling water to make 10 fluid ounces. Take ½ ounce of glue, allow it to soak in cold water till quite soft, pour off the excess of water, melt the glue down by gentle heat, and stir into the paste previously made. Now add 1 dr. of alum and a few drops of oil of cloves and stir well until dissolved. If the material should dry too hard add 1 or 2 dm. of glycerine.—H. B. S.

Old sardine boxes are to be manufactured into toys in France. After the sardines are eaten the empty box may be sold at a fair compensation to the toy factory.

AVOID CRUELTY TO WATCHES.

Wind Them in the Morning, and See That They Have Regular Habits.

The watch, in its sensitive mechanism, seems superior to many forms of animal life, when you come to think of it. At any rate it is of greater service to man than are most of them and should be treated more like a friend than a mere piece of machinery.

Always wind your watch in the morning—turn slowly and avoid all jerky movements. When a watch is wound at night it has only the weakened spring to offer resistance to the jerks and jolts of the daytime. The morning winding lessens the danger of breaking the main spring, which being no longer at full tension at night can stand the cold better. All watches keep better time as the result of better habits. Don't lay it down one night and hang it up the next. Keep it in the same position as nearly as possible. In second class watches the rate difference between the horizontal and vertical position is often quite significant. Nor should you hang your watch on a nail where it can swing to and fro like a pendulum. It will either gain or lose a great deal while in that position.

A watch should never be suspended or laid against a cold surface. The difference in temperature between your breast or waistcoat pocket, and a wall, that may be nearly at freezing point, is about 75 or 80 degrees. Sudden changes of temperature is the cause of most main springs breaking. The watch wearer should clean his watch pocket frequently, for there never was a joining made tight enough to keep out all the dust. This gets into the oil which thickens in time and necessarily produces irregularities of rate. A watch should be cleaned once a year. By this time the oil dries up and mixes with metallic dust; it grinds away on the works like emery. When you count up that a watch ticks 388,000 times in one day, you may realize the gigantic task it performs in one year. Treat your watch kindly and it will appreciate it and will serve you faithfully as a friend.

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THE WORLD'S FIRST OIL REFINER.

Weston Howland After Having Nearly Despaired Came by the Discovery Through Chance.

Weston Howland, who died recently in Fairhaven, Mass., was the first man in the world to refine petroleum oil. In this same town was born Henry H. Rogers, the man who has amassed many millions through his connection with the Standard Oil company.

Just before the rebellion Howland made his successful experiment on oil taken from the wells in Pennsylvania.

The oil had at this period had never been refined. In the early days the Indians had collected petroleum from the Alleghany river, says the Western Oil News, by spreading their blankets on the water and wringing them when saturated. To some people it was known as medicine and called Seneca oil.

With a kitchen kettle as a condenser Howland succeeded in distilling the liquid but the oil was both muddy and thick and gave forth an exceedingly bad odor. He improvised an aparatus from a milk pan and with the aid of alkalis and water succeeded in getting an admixture of oil and water. Disappointed and sick at heart he left the pan with the alkalis and water in his barn. The big doors were open, the beams of a hot sun worked upon the oil and when Howland saw the result he knew that his problem was solved. Purchasing the old works on Fish Island, between New Bedford and Fairhaven, he procured stills and began to manufacture oil for the market. Buying 1,500 barrels at 25 cents a gallon, he refined and sold it at 75 cents. Soon there were more orders on his books than he could fill. The last men to abandon the manufacture of oil in Fairhaven was Weston Howland.

WANT TECHNICAL SCHOOLS IN THE SOUTH.

A movement to establish technical schools for white boys in the South, launched by Richard H. Edmonds, of Baltimore, editor of the Manufacturer's Record, is meeting with the hearty endorsement of many of the other leading Southern journals. Mr. Edmonds' plan is that 1,000 or more Southern business concerns contribute $125 or more a year for four years, to give a technical education to 1,000 poor boys, the boys binding themselves to repay the money after graduation, so that the same fund could be used for aiding others. Thus every contributor, in effect, founds a perpetual scholarship. At present there are training schools for the blacks but few for whites.

HEROIC STATUE OF VERCINGETORIX.

Bertholdi's great statue of Vercingetorix, to be exhibited for a time under the central dome of the Grand Palais of the Champs Elysees, Paris, has just issued from the casting shop, says the Illustrated London News. A huge motor-car conveyed the work to the Grand Palais. The illustration shows the statute as it

left the foundry. Round it are grouped the chief workmen who co-operated in the casting, and in the very center stands the eminent sculptor, M. Bartholdi.

The work represents Vercingetorix waving his sword, reining in his charger and cheering his warriors to attack the Roman legions. The statue is to be stationed permanently in the squares of Clermont-Ferrand.

DEEPEST HOLE IN THE WORLD.

Probably the deepest hole in the world has just been dug in South Africa, near Johannesburg. It is 4,800 feet deep. If 15 buildings the height of the Masonic temple in Chicago, which is 21 stories high, were piled upon top of each other, making an enormous structure of 315 stories, and a pole should be extended from the bottom to the top of this structure, such a pole would little more than reach to the bottom of this hole in South Africa.

"It demonstrates what man will dare for gold," said a traveler when he viewed the seeming impossible feat. "No climate, distance over land or water, or depth of earth seems impenetrable to him in his mad desire for gold.

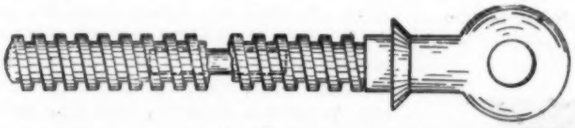
The hole was started early in January, 1899, and despite wars and reefs, encountered in the drilling, it has been pursued until the main reef has been struck. The actual time of drilling required 10½ months. Brazilian carbons which today are worth about $45 per caret were used in the drilling.

To harden small tools or articles that are likely to warp in hardening, says Shop Talk, heat very carefully, and insert in a raw potato, then draw the temper as usual. A bar of hard soap is also good, but will not make the tool as hard as the potato will.

HANDY WAY TO REPAIR A BROKEN BOX VISE SCREW.

An easy and effective way of repairing a broken box vise screw is described by W. D. Boettler in The American Blacksmith. The sketch shows the screw that was broken.

"I could not obtain another one to replace it," says Mr. Boettler, "without delaying my work too long, so I drilled a ⅜ inch hole in each broken end about one inch deep. I then



heated the ends and drove in a 7-16 iron pin of the proper length to allow the two broken ends to come together. I put the screw in a clean fire and took a good welding heat on the broken parts and welded them together by striking light blows with a small hammer on the ends. Then with a small filler in between the thread I welded in the pin. The thread did not waste away in the least. Since that time I have had no trouble with the screw whatever."

MADE A BALLAST OF CEMENT AND IRON.

A contributor to the Rudder tells of an interesting method by which he has solved the problem of putting ballast in a small boat. His boat was a 16-foot cat. He says:

"I had four inches between the bottom of flooring and the planking next the trunk and only 1½ inches on the outer edge. I nailed strips to the timbers to make them wider and put in floor timbers. This gave me a ½-inch lip or rabbet to support the ballast free from the planking. I procured some cigar box wood and laid it in between the timbers and lined the whole with heavy glazed paper.

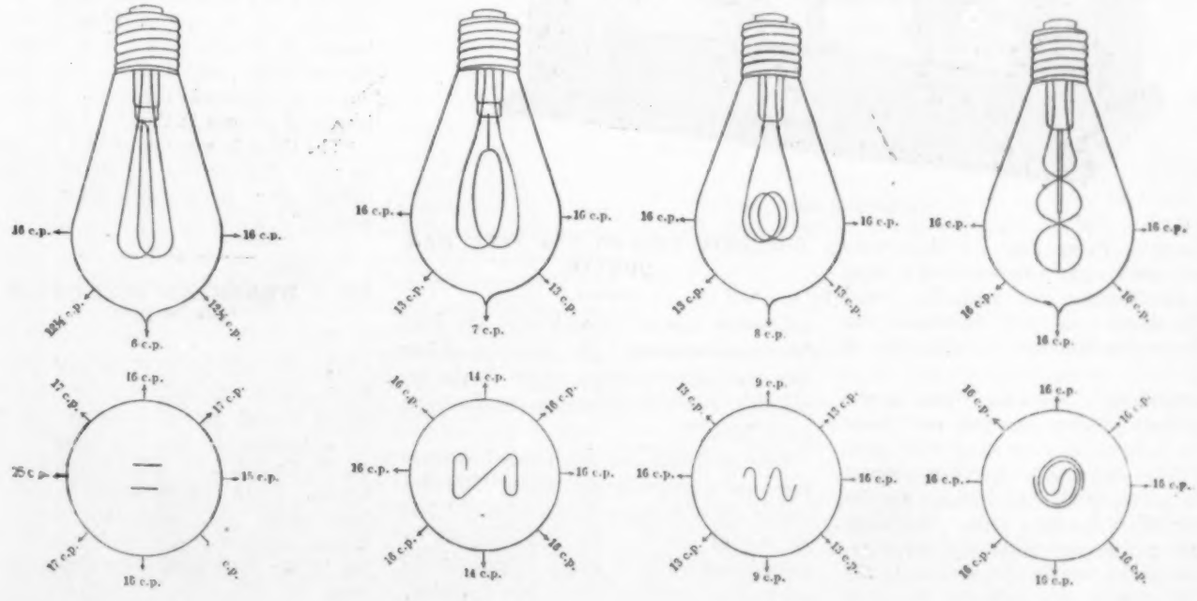
"Portland cement and sand were mixed half and half and poured in between the timbers to the depth of an inch. Old iron, broken in small pieces, was then put in and more cement and sand poured on. Wire, with brass rings attached, was set deep in the cement. This gave me a handle, which when hard, enabled me to lift it out. I numbered the blocks on one side, 1, 2, 3, etc., and on the other, A, B, C, etc. The next day they were hard, and I had a solid hard brick weighing between 50 and 60 pounds, that would not shift, that was clean and that salt water would not affect. The whole weight was on the timbers, as the cigar box wood had kept the bottom of block just that far away from the planking."

ELECTRA HOLDS THE STAGE (AND THE AGE.)

Youthful Electra, neatly clad and radiant amid glowing lights, dances with the Twentieth Century; while puffing, noisy steam, aged and blackened, is forced to retire from the stage under the

influence of her electrical wand. She looks at him with piteous eye, for his magic long made him a favorite of the world, but his powers to please are unable to cope with those of the new star of the present age. The cartoon of Linley Sanbourne, which so well illustrates the superior attractiveness of electricity, appears as a supplement in the Electrical Times.

Tests made by F. W. Wilcox for the National Electric Light Association are illustrated in the Electrical Review. The upper row of lamps show a side view, the lower row as looked at from the end of the lamps. The figures indicate the number of candle power of lights as thrown in a horizontal and in other directions.

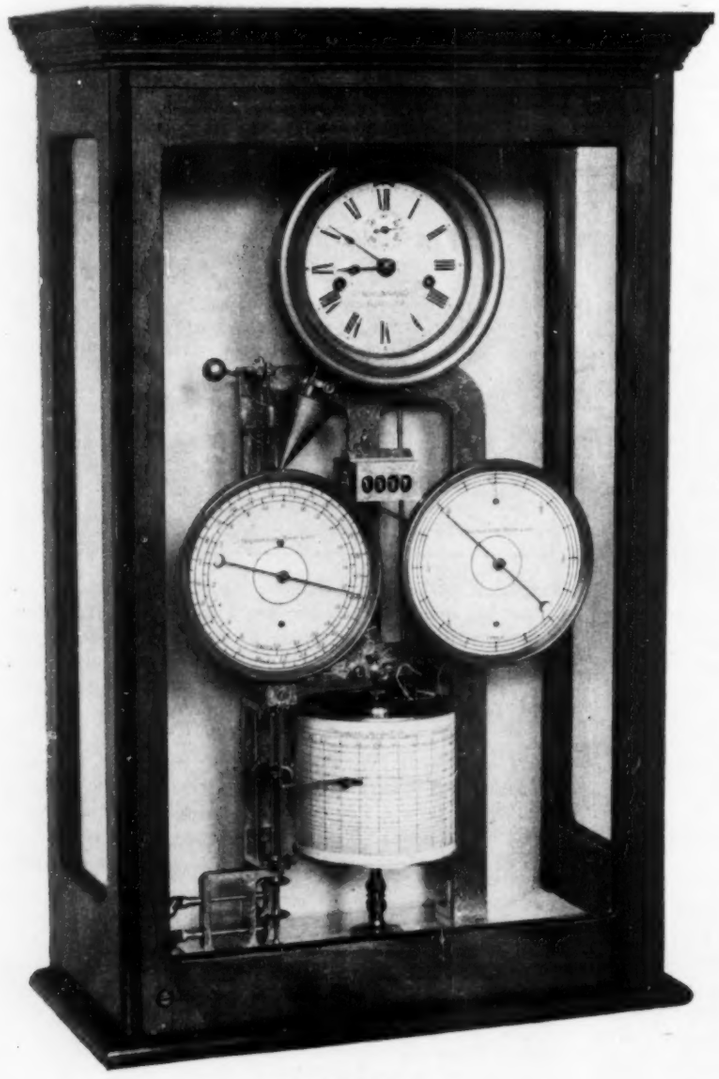


NEW AUTOMATIC RECORDING SHIP LOG.

The principle formerly followed by nearly all inventors of nautical measuring devices was that of towing a heavy float or propelling wheel on a line, in some cases as long as 450 feet. This line requires immediate attention when the ship stops or it is in great danger of being lost with its attachments. Every time the ship starts the line must be cast overboard, care being taken that it does not foul the vessel wheel. Heavy seas and driftwood also interfere with the accuracy of this class of log.

The Nicholson ship log, used in the famous race between the Erie and Tashmoo on Lake Erie, does away with quite all of these difficulties. The log operates entirely automatically and does not require attention when the ship stops. The water always acts the same on the float pipes, regardless of the weather or surface of the sea. It automatically indicates the speed of a vessel in miles or knots per hour, on a dial, and registers the same on a counter, also on a paper chart, with the day of the week and hour of the day, thus keeping a perfect record which shows momentarily every variation of speed, whether going or at rest.

This log is operated by means of two pipes which extend through the bottom of the vessel and cause a circulation of water.



NICHOLSON SHIP LOG.

CONCRETE TIES ON THE PERE MARQUETTE.

Concrete ties are being laid on the Pere Marquette railroad. The company claims that they are of great economy in the renewal of ties and a saving in roadbed and track labor.

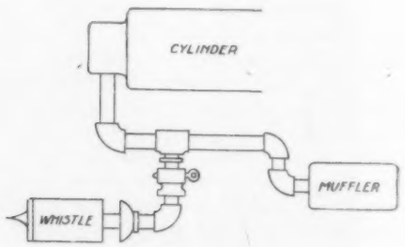
Only moderate pressure is used to compress the concrete in the molds. Wooden blocks about 1 foot 6 inches wide are laid on top of the concrete and fastened by bolts imbedded in concrete. These blocks are used as a cushion and to permit spiking.

WHISTLE FOR GAS ENGINE.

Invention that Breaks the Record for Unearthly Shrieks.

The most strenuous thing yet in the way of an alarm horn for automobiles has been discovered by S. W. Rushmore, of Jersey City. Beside it the shriek of the fire boat is like a child's whistle and, the fog horn would be inaudible if they were blown simultaneously. Mr. Rushmore thus tells the Automobile Magazine how he came by the invention:

"I blew up the muffler of my Winton machine and noticed that a considerable increase of power accompanied the exhaust, and decided to see what gain there would be in cutting out the muffler of my 12-horse power Packard. I placed a T in the exhaust pipe and to this connected a 1½ inch brass blow-off valve with lever connected to a foot button. I also coupled on an elbow so that the blast is directed



backward and does not stir up a dust. Just as I got the thing finished I noticed in the shop a tug-boat whistle with a bell 5 inches diameter and 12 inches long, that exactly fitted on the pipe. I screwed it on, as per sketch herewith.

"When the relief valve was opened the whistle let out the most unearthly shrieks, showing that as the whistle was set for 100 pounds steam the initial pressure of the exhaust in the pipe leading to the muffler exceeded that amount. Each shriek was apparently of shorter duration than the length of a stroke and I thus argue that the excessive intial back pressure is not due to any defect in the muffler but to the inertia of the gas in the pipe leading to it.

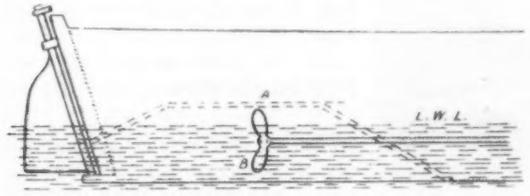
"The thing is a great success in waking up truck farmers that I meet on the road, before they know what they are up against."

ONLY WOMAN HARNESS MAKER IN THE WORLD.

What is said by the National Harness Review to be the only shop in the United States owned, run and operated entirely by a woman, is that belonging to Mrs. M. D. Lydick in a country town in Nebraska. From making waxed threads and hame-straps she progressed to a full-fledged harness maker, and is said to be one of the most skillful "workmen" in the state.

PROPELLER FOR FLAT BOTTOMED BOAT.

It is possible to drive a flat-bottomed boat by a propeller by having a trunk A near the stern in the shape of a box with an inclined plank at each end to allow water to flow to, and get away readily from, the propeller B. The after end of the plank

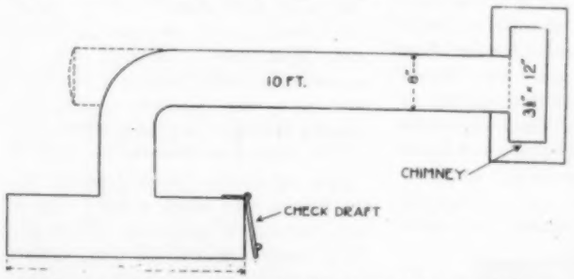


at the stern should be just below the water-line (L. W. L.), say about 1½ in. For a boat 25 ft. by 6 ft. a simple high-pressure engine 3½ in. by 3½ in., with suitable propeller, should give a speed of five miles an hour and leave no wash.—Work.

TO PREVENT TROUBLE WITH HOUSE FURNACES

A querist to the American Artisan asks regarding a furnace which he found to smoke badly and which would not furnish heat for two rooms, 16 by 16, with 10-foot ceiling. "I found the furnace properly installed so far as I could see," he said, "but the chimney was choked with soot from top to bottom and the pipe from furnace to chimney. The pipe was 10 feet, 8 inches diameter, height of chimney 40 feet, inside dimension 3½ by 12 inches. I herewith inclose pencil plan of smoke from furnace.

"The chimney is not large enough for the size firepot in the furnace. As we have only been told that the firepot is 24 inches in diameter and nothing is said about diameter of grate, we will assume that the grate is also 24 inches in diameter, because it is from the area of the grate in the furnace that we must build the capacity of the chimney on. A grate 24 inches in diameter would be considered just about the capacity of three horse-power in boiler rating, the fire of which is practically the same



as that in hot-air furnaces, and with the height of chimney 40 feet it would require a round, smooth chimney 9 inches in diameter if made of pipe, or brick chimney 9 inches square. The chimney in question is 3½ by 12 inches, and even if it were clean and smooth, which is doubtful, there would be only 42 square inches of area in the chimney, while 81 is required if constructed of brick, and the smoke pipe should be 9 inches in diameter from furnace to chimney and frequently cleaned to keep the capacity, as soft coal makes soot fast. The insufficient capacity of the present chimney and smoke pipe is, in our opinion, the special cause of the smoke which escapes through the house. With the proper size chimney there should be a great deal more heat than it is possible to get from the furnace in its present condition. Flat or narrow brick chimneys are bad, as they choke quickly and are hard to clean, and long or even short sections of smoke pipe in a horizontal position should be provided with cleanouts, so that the soot can be removed easily without taking down the smoke pipe to do it, and we therefore suggest that a cleanout be fixed on the end of elbow as indicated by the dotted lines in sketch."

POINTS ABOUT SMALL TELEPHONE EXCHANGES.

How to Build Them, the Cost, and the Way to Make Them Pay.

In the construction of small telephone exchanges there are many things pointed out by The Electrical Review of Jan. 4 that are worth remembering. Among them are noted these facts:

To build a respectable line of 25-foot poles with, say, one circuit upon it, requires an expenditure of from $75 to $100 per mile, including instruments. To make this line remunerative requires an income of $100 a year for each five miles of its length.

The greatest cost of building a small line consists in the setting up of the poles and cross-arms, after which the cost of new circuits is but little greater than that of the wire and instruments. In order to reduce the first cost of building farmers will, in he winter time, frequently cut and haul poles to the road free of expense to the company, and in some cases even go so far as to furnish the labor necessary for setting them up, the telephone company, of course, superintending the work and retaining control after the line is built.

When the line has to leave the main road to reach a subscriber's premises the expense of building to the house should always be borne by the subscriber who, if he wishes, may furnish his own poles. In communities that will not likely require long distance service and which are not vexed by trolley roads, grounded lines will furnish a satisfactory means of communication. Some grounded country lines, as a fact, are quieter than most metallic circuits in a city. As to long distance service the proper use of repeating coils will allow a very fair service from a grounded line up to 100 or 200 miles, which is about the limit for an ordinary instrument anyway. It is generally advisable to use only No. 12 iron wire for line of this character on account of its strength and cheapness.

As to the remuneration the best plan is for the solicitor to visit a group of farmers and propose to put six telephones in that neighborhood at a cost of $18 per year for each instrument, in consideration of a three years' contract, the company agreeing to put in bridging instruments and metallic circuits. The number of telephones on one line ought to be limited to six. It is better to have two five party grounded lines than one ten-party metallic-circuit line.

All poles should measure not less than 20 inches around the top, and should be set in the ground as though intended to stay there 20 years. They should also be roofed and gained, and roof, as well as gains, filled with a good oil paint. If there are only two wires to string on the line, brackets may be used, but if there are more cross-arms should be put on. Ten-pin cross arms cost about $9 a mile more than brackets but are more permanent and reduce the cost of future construction.

All poles should be guyed where angles occur in the line and should not be set further than from 140 to 150 feet apart, and 132 feet is better still, for if poles are set too far apart it is almost impossible to keep the wires tight enough to keep out of trouble. With poles set forty to the mile and the wires properly pulled up there is no reasonable excuse for crosses or other line trouble even though the pins are placed ten inches apart.

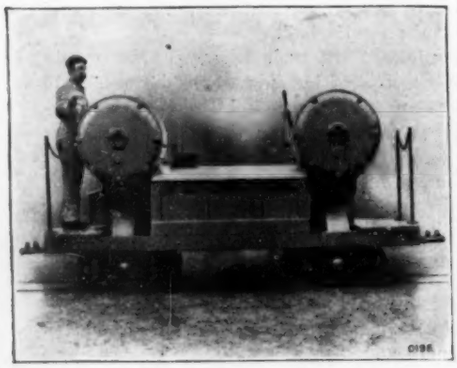
As to the rate of $12 a year made by some rural communities, it cannot be made remunerative unless it be possible to place about ten or twelve parties on one line and the line so arranged that they will not ring the exchange except for an exchange connection, which can be arranged by means of a grounded line so connected that they can ring the exchange by pushing a button.

The new order that department surgeons go to all big fires in New York to attend injured firemen is proving successful. One surgeon must respond to every second alarm and take with him the necessary dressings to treat the injuries the firemen may sustain.

ELECTRIC LOCOMOTIVES FOR SHOP WORK.

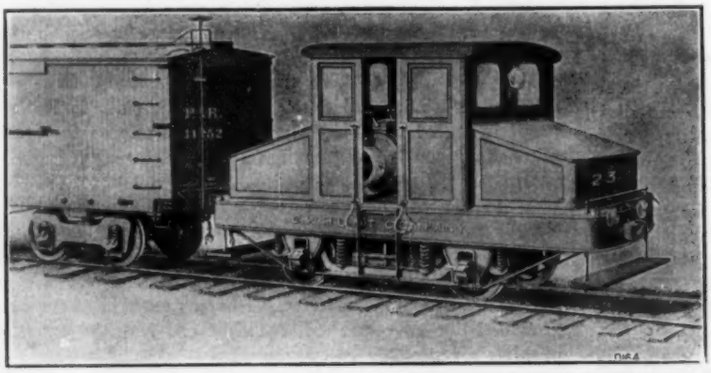
Great Improvement on Old System of Handling Heavy Materials.

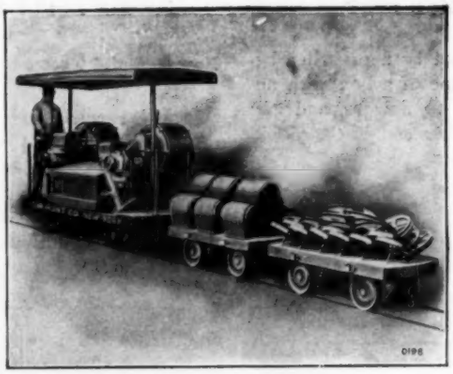
The electric locomotive is rapidly winning itself into favoritism in many fields where steam and manual power were formerly employed. Where overhead wires are undesirable, the storage battery locomotive solves the problem of moving heavy material in factories, foundries and lumber yards on narrow gauge cars. It enables one man to handle all the material of a large manufacturing establishment, runs with perfect freedom around curves of twelve feet radius, and is able to ascend grades. The C. W. Hunt Company, of West New Brighton, N. Y., which is extensively engaged in the manufacture of these locomotives, reports that there is a great demand for them in all the leading manufacturing establishments of Europe and America.



The storage battery is recharged at night or at intervals during the day when the locomotive is idle. The battery is divided into sections, which are connected through the controller with the motor armatures and fields in various combinations of series-parallel connections, thus obtaining the different variations of draw-bar pull and speed required for general shop work.

The approximate weight of the locomotive in running order is five tons. The speed per hour varies from one to four miles. On the level it will pull 50 tons and on a 5 per cent grade 6 tons. We illustrate several types of locomotives.





TWO MECHANICAL EXPOSITIONS IN BRUSSELS.

Two international exhibitions of automobiles, cycles, etc., will be held in Brussels in March. They are the International Exhibition of Mechanical Locomotion, in the Park Cinquantenaire, March 8 to 17, and the Tenth International Exhibition of New Locomotion, at the Pole Nord, March 15 to 23. In the former there is to be a section devoted to aerostatics, organized by the Aero Club of Belgium. The exhibition will include every kind of known mechanical locomotion. Fifty per cent of the eventual profits of the exhibition will be returned to exhibitors.

MAINE'S ENORMOUS OCEAN FARM.

Lobsters to Be Hatched by Machinery—Fisheries Yield $3,000,000 Yearly.

No other state in the Union contributes so bountifully to the deep-water delicacies that supply the tables of the east and west as Maine. In one year the sea fisheries of that state yielded a total of more than 152,000 pounds. The value was nearly $3,000,000. To conduct this enormous ocean farm required the labors of nearly 17,000 persons. Steamers, vessels and boats of all kinds, to the number of 7,154, were employed.

The lobster fishery is the most important in the state. The value of the lobsters taken in 1900 was $1,038,000. Because of the growing importance of this enterprise the government is taking steps to have the lobsters hatched out by machine. Money has been appropriated to build a lobster hatchery and the station will be finished next year. The industry brings to maturity a much larger proportion of the young, says the Fishing Gazette, in that during the hatching and immature period of the individual existence it is protected from all its natural enemies, to which it is a pray in natural conditions.

CITY OF EDINBURGH IS WELL PAVED.

With an area of 16½ square miles, the city of Edinburgh has 82 miles of granite streets, two miles of wood pavement, and about 80 miles of the best macadam. No asphalt has been laid, chiefly because of the broken, hilly nature of almost the whole area covered by the city requiring street gradients which, it is thought, would render asphalt unsafe for traffic during most of the year.

The present wood pavements are constructed of Australian hard wood which contains a natural oil that does away with the use of creosote, formerly infused into the wood blocks as a preservative. Blocks 9 by 5 inches and 3 inches thick are laid on a 6-inch concrete bottom with smooth surface and joined with cement grout or asphalt. This paving costs about $4.10 per square yard. Nine by 7 by 4 inches granite blocks laid on a 6-inch concrete bed and joined with gravel, cost $3.60 per square yard.

A minister's little daughter and two little boys, the sons of commercial travelers, were talking about their respective papas, and what they did. One little lad said, "My papa sells shoes," and the other said, "Mine sells paper," and turning to the little girl, "What does your papa sell?" For a moment the child hesitated, but not to be outdone by the boys, she replied, with the air of a duchess, "My papa sells talk."

Mrs. Manning—"John, I believe you are the biggest liar in the world. The fact is you don't care a fig for me, or you wouldn't try to deceive me all the time. There was a time when you said I was the best and sweetest woman on earth."

Mr. Manning—"And you believed it. Then why can't you believe the little fibs I tell you now?"—Boston Transcript.

Mr. Kelly—"An' how are ye this mornin', Mistress Flyn? Is yer rheumatiz any better?"

Mrs. Flyn—"Well, yis, I think it is, I thank ye koindly. The new doctor's treatment is doin' me a' worl' av good, I belave. He advoises me to take queen ann eternally, and to rub anarchy on me j'ints. So I'm doin' it, an' I think it's helpin' me wonderfully."

"I lost me $5,000 in Wall street." "Vas you a bull or a bear?" "Nider; I vas a big-eared jackass."

PLANS FOR A CORN MEAL MILL.

In the January American Miller is given plans for a short-system corn meal mill, as follows:

Buildings—One and one-half stories; height, 36 feet from ground floor to peak of the roof; ground space 20 by 24 feet; height from first to second floor, 12 feet; grinding floor, 14½ feet high; pit underneath ground floor to accommodate boot of grain elevators, 5 feet below ground level.

Cisterns—Three gradual and continuous reductions without immediate separations; one separation of meal and bran.

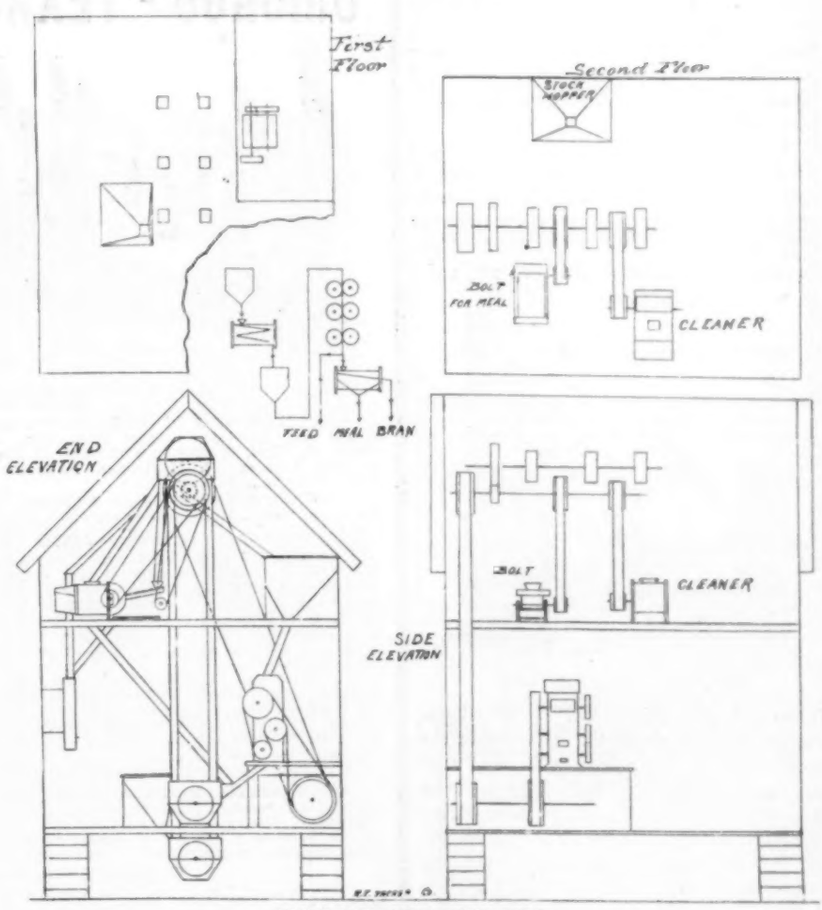
Machinery—One three-high roller mill, 9x18; first reduction rolls corrugated, 8 cut to the inch; moderate spiral cut, running sharp to dull, with a differential of 3½ to 1; speed of fast roll, 450. Second reduction rolls corrugated 12 cuts to the inch; moderate spiral cut, running sharp to dull; differential, 3½ to 1; speed, 600. Third reduction rolls, corrugated, 16 cuts to the inch; moderate spiral cut, running sharp to dull; differential, 3½ to 1; speed, 700. One sieve bolter, with eccentric motion; size of sieve, 3 by 6 feet, clothed with No. 20 wire.

One grain elevator, 28 feet between pulley centers, with buckets 4½ by 6 inches; one grain elevator, 24 feet between pulley centers, with buckets 3½ by 5 inches; one meal elevator, 24 feet between centers, with buckets 3½ by 5 inches; one corn cleaner, with suction and blast.

Quality of Meal—Clear, granular and bright.

Capacity—Eight hundred pounds per hour.

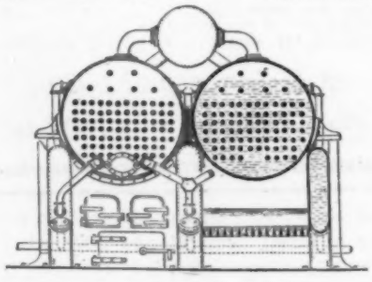
Yield—Two bushels of corn per 100 pounds of meal.

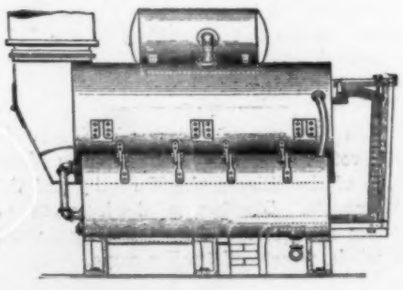


PLANS FOR CORN MEAL MILL.

WATER WALL MARINE BOILER.

A water wall horizontal boiler for steamships is described in the American Shipbuilder, which saves two feet in space and three tons in weight, and which will steam with salt water. The usual outside steel casing is done away with, the water walls becoming the legs for the boiler. The inventor is Capt. Linnekin.





COMPANY TO MAKE PETROLEUM BRIQUETTES.

A company has been formed in France for the manufacture of petroleum briquettes. It claims to have so far perfected this substitute for coal that the former objection of its injuring boilers by reason of some chemical action produced by combustion, have been obviated. The briquettes have been manufactured in various ways in the United States, Russia and France as a combustible for steamships and certain industries where rapid production of heat was desirable. These objections, however, detracted from its utility. The method of manufacture is very simple and requires but little machinery.

A Boston man has invented a tricycle which works as a street sweeper. It may be run by foot power or by motor.

SAYS TOO MUCH SALT PRODUCES CANCER.

Too much salt in food is the chief cause of cancer, according to Dr. James Braithwaite, of London. He says that four chief factors enter into cancer production: Overnutrition, non-oxidation of ingested food, local irritations and excess of salt in the diet, the last of which he considers the most important and always present. He arrived at the theory regarding salt through noticing that uterine cancer rarely afflicted Jewesses, whose religion excludes salt pork from their diet.

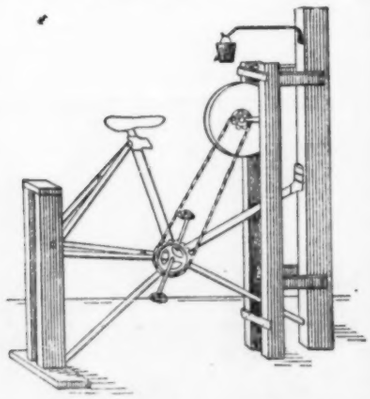
"Billson is from the country," said Tylers, "but he kept the fact pretty well concealed until the other night, when he was at a party the hostess asked him if he liked Welsh rarebits, and he said no, that for his part he preferred Belgian hares." R. H. L.

A new cult has been born in the city of St. Louis. Its followers are known as earth-eaters, and believe it conducive to their health to eat a teaspoonful of a dirt each day.

A GRINDSTONE SCORCHER.

A new use for bicycles has been discovered. It is to run grindstones with them. John Arrowood, the first to transform the wheel in this useful piece of mechanism, tells the American Blacksmith how it is done:

"I had the frame of an old bicycle and used it in connection with the stone. I first cut out the middle brace of the bicycle and with a 2 by 4 timber made the rear support. Next I stapled the front of the bicycle to a stout post and then made the



frame of the grindstone. I braced the bicycle frame underneath. By cutting the spokes out of the rear wheels I secured the small sprocket. I then fitted a small piece of wood into the square hole of the grindstone, bored a hole in the wood the size of the sprocket axle and fitted the axle to the stone. I cut notches in a piece of iron for the axle to rest in and nailed the iron to the frame. As the stone was quite high, it was necessary to obtain two chains and put them together.

"The machine is now a handy ball-bearing grindstone, which runs at lightning speed and cost but little to make."

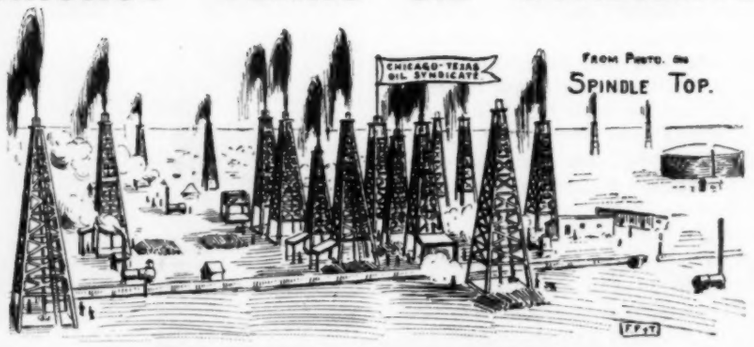
Montevidio, Uruguay, is to hold an exposition of goods manufactured exclusively in the United States. It will be called "The First North American Exhibition on the River Platte."

COLDBURN Is a Salve which if promptly applied will cool

all ordinary burns from fire, hot iron or hot water, and will absolutely prevent blister. Takes out all the burn in from one to five minutes. Will not cure everything, but is excellent for reducing inflammation and healing many chronic sores, chapped hands or lips, etc. Is made of the purest vegetable products only, and is perfectly harmless. Excellent for tightness of the throat or chest. Although in use for many years, is now put on the market for the first time. Once used, always wanted. Sent postpaid anywhere, 25 cents. If not as represented money cheerfully returned. Address

COLDBURN, Room 604
162 Washington Street, - Chicago

CHICAGO - TEXAS OIL SYNDICATE



Capital Stock, $1,000,000.00 in shares of 50 cents each
Full paid and non-assessable

OFFICERS AND DIRECTORS—President, W. C. Moore, President of the Moore-Cortes Canal Co., Houston, Texas; Hon. Wm. E. Mason, United States Senator from Illinois; Perry A. Hull, Master in Chancery of the Circuit Court, Chicago; Treasurer, O. C. Drew, Cashier Planters' & Mechanics' National Bank, Houston, Texas; S. R. Perryman, Attorney, Houston, Texas.

REFERENCES—Chicago National Bank Chicago, Ill.; Planters' and Mechanics National Bank, Houston, Texas; The First National Bank of Beaumont, Texas.

WHAT THIS SYNDICATE OFFERS

It owns 437 acres of the choicest oil lands in Texas. Its first well on Spindle Top Heights, Beaumont, is now nearly completed. There are one hundred and ten gushers within a stone's throw of it—on every side. This well would have been completed before this except for the fact that for four weeks the drill was in the hardest rock yet struck on Spindle Top, and it took three weeks' drilling, night and day, to get through this forty-foot stratum. This was finally penetrated and the drill is now sinking rapidly. A gusher may be expected daily. This hard rock is an excellent indication of a big deposit of oil beneath it.

In addition to the Spindle Top Heights property, the Syndicate owns 400 acres at Sour Lake (within a few hundred feet of where a gusher has been struck), at Dayton Prairie, at Saratoga and elsewhere. Gushers are now in at Saratoga and Sour Lake and flowing perfect lubricating oil, making the proven oil fields of immense value. These lands are all paid for and owned outright by the Syndicate, therefore there are no leases and no royalties to pay.

A GUSHER GUARANTEED WITHIN THIRTY DAYS

This Syndicate guarantees a gusher on Spindle Top Heights within 30 days. A limited amount of treasury stock is offered for sale at 50 cents per share in lots of 50 shares and upwards. Money now subscribed for stock will be refunded directly to the subscriber if the Syndicate has not a gusher within 30 days. Out of town subscribers may deposit subscriptions in their local banks and notify this company at the address below.

MARKETING ARRANGEMENTS MADE

The demand for Texas oil is world wide and enormous. The only problem is to get the oil to the market. This problem has been solved by the Syndicate.

This Syndicate has just bought 20 acres of tankage ground, with 1,000 feet frontage on the railroad (The Texas and New Orleans Branch of the Southern Pacific), only 1½ miles from Spindle Top. This will give trackage for 30 tank cars that can be loaded at one time. Tanks and a pipeline from the Syndicate's wells to its tanks and loading racks will be built at once. This will give the Syndicate unexcelled facilities for marketing the products of its wells.

With these arrangements made, as soon as a gusher comes in, the property will be greatly enhanced in value, and

The price of the stock Will at Once Advance and will thereafter continue to go up rapidly ON MERIT ALONE

It is now offered at par—50 cents per share—the ground floor price. Dividends will be paid as soon as earnings begin. That time is not far off—BUY NOW. The company is managed by men of recognized ability and known integrity.

No preferred stock—all shareholders on absolutely the same basis. When you buy and pay for this stock you can never be to any more expense. It can never be assessed.

Send requests for extended prospectus, remittances for subscription or any information to

$25	buys	50	shares
$50	"	100	"
$100	"	200	"
$200	"	500	"

Fidelity Trust & Investment Co.,
511 B Stock Exchange Bldg., Chicago

INQUEST OVER A MUMMY.

Probably the first coroner's inquest over a mummy has just been held in London. A man who opened a case containing a Peruvian mummy intended for a museum became frightened and notified the authorities. The following verdict was returned:

"That this woman was found dead at the Railway Goods Station and did die on some date unknown and in some foreign country, from cause unknown. No proofs of violent death found and the body has been dried and buried in some foreign land, probably sundried and cave buried. The jurors are satisfied that this body does not show any recent crime in this country and that deceased was unknown and about 25 years of age."

William Livingstone, of Detroit, who years before was president of the Lake Carriers' Association, has again been elected to that office.

The Kearsage, to be sent to Venezuela to protect American interests, is a sister ship of the Illinois, the Kentucky and the Wisconsin. She has a displacement of 11,525 tons, carries four 13-inch guns and a whole arsenal of smaller arms.

VALUABLE MECHANICAL, ELECTRICAL AND OTHER TECHNICAL BOOKS.

TECHNICAL BOOKS FURNISHED ON EVERY SUBJECT.

A. B. C. of Electricity, 50 cts.
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Architectural Prospective for Beginners, $3.
Blue Print Making, 25 cts.
Brick Laying, 86 pages, $2.
Bicycle Repairing, 208 pages, $1.
Car Builder's Dictionary, $5.
Carpentry Made Easy, 144 pages, $1.
Cottage Designs, $1.
Electricity Made Simple, 233 pages, 50 cts.
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Electric Railway Engineering, $2.
Electric Measurements for Amateurs, $1.
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Electricity Made Easy, $1.50.
Easy Lessons in Architecture, 87 pages, 50 cts.
Furnace Work Manual, 268 pages, $3.50.
Foundations and Foundation Walls, 166 pages, $2.
Furniture and Cabinet Finisher, 98 pages, 50 cts.
How to Do Business, 200 pages, $2.
Furnace Making, 170 pages, $1.50.
The Gas Engine, How to Make and Use It, 75 cts.
Green House Construction, 219 pages, $1.50.
Harness Maker's Complete Guide, 240 pages, $2.50.
How to Build Poultry Houses, 50 cts.
Handbook of Corliss Steam Engines, 244 pages, $1.
Higher Mathematics, $5.
How to Build Dynamo Electric Machinery, $2.50.
The Interpretation of Mathematical Formulae, $1.25.
Inexpensive Country Homes, 88 pages, $2.
Knights of the Grip, 179 pages, 60 cts.
Linear Drawing and Practical Geometry, 118 pages, 75 cts.
Modern American School Buildings, 89 pages, $4.
Modern House Plans for Everybody, 243 pages, $1.
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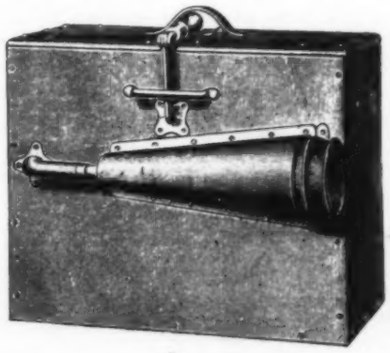
One Hundred Tinner's Patterns, $1.
Pigeons and All About Them, 664 pages, $1.
Punctuation, 50 cts.
Pocket Electrical Dictionary, $2.50.
Ropp's Commercial Calculator, 50 cts.
Something About X-Rays for Everybody, 50 cts. and 25 cts.
Stair Building Made Easy, 127 pages, $1.
Suburban and Country Homes, $1.
Treatise on Hydraulics, $4.
Text Book on Roofs and Bridges, 4 parts, $2.50 each.
Trevert's Tricks with Electricity, 50 cts.
The Train Wire, $1.25.
Telephone Handbook, $1.
The Universal Carpenter and Joiner, 144 pages, $1.
Vignola, the Five Orders of Architecture, $5.
Warwick's How to Make and Run a Gas Engine, 75 cts.
Why Poultry Pays and How to Make It Pay, 50 cts.
Watson's How to Make a One-horse Motor or Dynamo, 50 cts.
What Are We Here For? $1.
Wood Carving for Amateurs, 80 pages, 50 cts.
Wood Working for Beginners, 551 pages, $3.50.
Sent anywhere prepaid on receipt of price. Address POPULAR MECHANICS, Journal Building, Chicago.

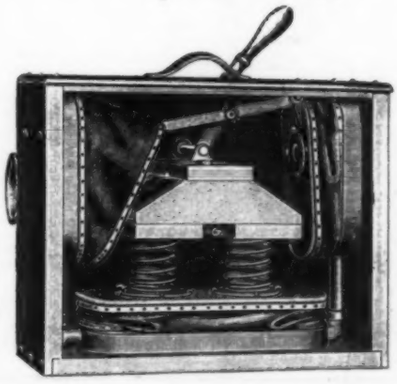
WATER A GOOD MEDICINE.

Pure water, a teakettle and a fire constitute the best remedy for many ills, says Medical Talk, and in many cases is far more effective than drugs. If your liver is out of order, drink hot water, drink plenty of it, drink it morning, noon and night. Don't be afraid of drinking too much of it. If your kidneys are out of order, drink water, drink much water; get the purest water you can, but drink, drink, drink, until you have flushed out the sewers of the body and made clean the excretory channels of the whole glandular system.

PORTABLE FOG HORN.

A five-year-old child can work the fog born invented by a Massachusetts sea captain, and can sound a danger signal which





will be heard five miles away. Our illustrations show the exterior and interior of the horn, which is portable. The bellows are worked with a small lever, by hand, producing a loud noise when the air rushes through a reed.

PUZZLING LINES.

The horizontal line appears to be the

shorter of the two in this picture. Measure them and you will find they are of identical length.

The icy winter weather without suggested to the teacher of the banner class that it was a good time to imprint a deep lesson on the children's minds.

"Now, Johnny," she said, "tell me the name of the hot place where bad people who steal money go to?"

"Florida," said Jimmy.—Tribune.

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FOR SALE—Five sets of 1-12 h. p. electric motor castings, for $1.00 per set. Photo for stamp. Roy A. Crihfield, Lincoln, Ill.

ENGINEER'S LICENSE—Mechanics, Engineers, firemen, electricians, etc., 40 page pamphlet containing questions asked by Examining Board of Engineers; sent free. Geo. A. Zeller, Publisher, Room 592, 18 S. 4th St., St. Louis, Mo.

FOR SALE—Job lot new electrical goods given us to sell; list for stamp. We handle everything electrical and at lowest prices. Stamp for catalogue. Dept. N., T. Binford Electric Works, 904 Washington Blvd., Chicago, Ill.

HELP WANTED.

WHY NOT TRY SIGN PAINTING? No experience required; no fraud; samples, instructions, etc., 10c. City Sign Co., Springfield, O.

TOOLMAKERS—Two. Address, stating experience and wages expected. Sterling Electric Co., Lafayette, Ind.

PATTERN makers—First-class men familiar with car and car casting work preferred; first-class wages, steady work. Apply to Superintendent Illinois Car and Equipment Co., Hegewisch, Ill. Take Erie, Ft. Wayne, Monon or Nickel-Plate road.

AGENTS—We have what you want, self-lighting pocket lamp, size of lead pencil, burns perfectly; rapid seller; seeing is believing; sample free to agents. Fountain Pocket Lamp Co., 127 Duane St., New York.

LATEST hit. "Mirror-in-your-hat," with your name on. Sticks in any hat. Entirely new; 12,000 sold first week. Sample free. Bryan Co., mfrs., C. 113, Cincinnati, O.

CIVIL Service Government Positions—9,889 appointments made last year; probably 10,000 this year. Only common school education required for examination. Catalogue of information free. Columb. Corr. Coll., Washington, D. C.

SALESMAN—To carry as side line "The Tourist Shirt Waists," patented. Address Steppacher & Stern, Baltimore, Md.

DRUGGIST—Must speak German; permanent position to capable man. Address Jas. M. Kenty, Gretna, Manitoba.

AGENTS—We have what people want; lamp that makes its own gas at cost of 1 cent a day; sells for $1; will send small model free to those wishing to work for us. Write our Department B today. Empire Gaslight Co., 90 West Broadway, New York.

POPULAR MECHANICS—Pays best percentage to agents; easy to make $5 a day. Write for particulars.

WANTED—Man in every city where artificial gas is used to sell our Magic Gas Igniters. No more matches needed. Lasts forever. Magic Gas Igniter Co., Indianapolis, Ind.

AGENTS—Newly patented household necessity; just out; entirely new article; immense seller; large profits; stamp for particulars. Sims Mfg. Co., Buffalo, N. Y.

AGENTS—Wanted; cheaper than brooms; sells everywhere; agents are making $3,000 to $5,000 per year; write for territory at once. The Gleaner Brush Co., Haverhill, Mass.

RULER—Union man; no strike. Skinner & Kennedy Stationery Co., 410 N. 4th St., St. Louis, Mo.

BIG seller this time of year; everybody will use one or more boxes; good profits; send for sample and terms. G. O. Myers Co., Atchison, Kas.

WANTED—An all round harness man for light and heavy work; must understand the business and know the cutting; also another man to do good and medium grade of light work. Ed. Struensee Co., Grand Rapids, Mich.

"Who are you, that you come here and talk to me like that?" asked one of the officers of the corporation. "Are you a stockholder?"

"No, sir," he thundered; "I'm one of the strapholders.

BUSINESS CHANCES.

FOR SALE—Steam auto truck; cost $5,000; sell for $300. 354 Dayton St., Chicago, Ill.

WANTED—Manager; responsible; to take charge of warerooms and office to be opened in Springfield, Ill., to further business interests of old established manufacturing concern. Salary $125 per month and extra profits. Applicants must furnish good references and have $800 cash. Address Manager, P. O. Box 1421, Philadelphia, Pa.

ESTABLISH a business. With our help you can become a dealer in a line of goods that are necessities in life; a business that will give you a steady and increasing income; a splendid opportunity for an honest, ambitious person; only one in each locality can secure it. Full particulars free. Write today. Decatur Extract Co., Decatur, Ill.

AUTOMOBILES—Gasoline motors, 1¼ to 5 h. p. copper flues, float feed carburetors, mixing and pin valves, steam fittings, auto bells, odometers, caps, steam and air gauges, Dow spark coils, plugs, batteries, apple igniting dynamos, radiating coils, lamps, gradometers, chains, injectors, band brakes, channel iron frames, springs, wheels, bodies, etc.; get catalogue. Dasey Co., 19 La Salle St., Chicago, Ill.

PATENTS—H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., Washington, D. C. Established 1883. I make an examination free of charge, and report if a patent can be had and exactly how much it will cost. Send for circular.

FOR SALE—One blacksmith shop, wagon shop, paint shop, barn, shed and dwelling; unexcelled for pump and farm machinery business. Cheap. Address P. W. Peters, Woodland, Wis.

INFORMATION WANTED.—Subscriber has a small machine shop he is anxious to establish in a small, thriving town; good equipment for doing work; is a first-class machinist and draughtsman, also expert bicycle maker and fine gunsmith. Suggestions of a favorable locality acknowledged with grateful thanks and postage paid. W. E. Piper, 343 E. 43rd St., Chicago, Ill.

FOR SALE—My stock of harness and saddlery; also the lot and building; located in one of the best towns in eastern Nebraska. Poor health cause of selling. W. R. Christman, Hooper, Dodge Co., Nebraska.

POSITIONS WANTED.

SITUATION—Wanted by engineer; understand running dynamo, high-speed Corliss engines; do all repairs; best references. Address W. E. Young, 3800 Lake Ave., Chicago, Ill.

SITUATION—Wanted by bookbinder as forwarder or finisher, or foreman; in small city, Illinois preferred. Address Lock Box 284, Mattoon, Ill.

WANTED—Experienced French lady teacher wants home in exchange for lessons. For references apply to Mlle. Villere, 578 E. Division St., Chicago, Ill.

WANTED—The address of F. D. Siebold, harness maker; reward paid. John Siebold, Pearl City, Ill.

WANTED—Hustling young man with ten years' experience would like position in retail hardware and stove store; thoroughly familiar with prices; A1 references. Box 341, Taunton, Mass.

POSITION—By a practical, energetic, up to date cornice and skylight maker as working foreman with reliable firm. Thomas Mack, 180 South Second St., Brooklyn, N. Y.

POSITION—As foreman, by a first-class, up to date steel range maker, with all the latest idea of tools for the construction of cooks and ranges; strictly temperate and references A1. Box 1, 1205 Fisher Bldg., Chicago, Ill.

POSITION—As salesman in any line of metal work; good address, tact and energy, thorough knowledge of manufacturing; first-class references from reliable firm. "Salem," 117-119 South Fourth St., Philadelphia, Pa.

POSITION—By salesman for steam, hot water and hot air heaters, having a wide acquaintance with New England trade; is open to engagement for 1902; expert engineer, good business ability; references furnished; state territory and other requirements. "S. and H. W.," 70 Kilby St., Boston, Mass.

POSITION—By a young married man with three years' experience at the tinner's trade; can do slate roofing; would like chance to finish trade in Ohio or Illinois; can furnish references; state wages. E. W. Hiatt, 520 Penn St., Muncie, Ind.

POSITION—As plumber and gas fitter; nine years' practical experience in a general line of plumbing work; temperate and reliable; reference; no tin work. John J. McMullen, 188 Straight St., Paterson, N. J.

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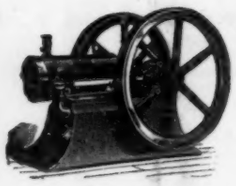
Slow Speed
Safe and Sure



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